MEASUREMENT OF FETAL CROWN-RUMP LENGTH (CRL3 BY REAL TIME ULTRASONOGRAPHY

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When estimating the predicted date of birth by ecography, the growth retardation of the fetus can cause possible mistakes, particularly when retardation reveals itself with a proportional reduction (type 1 of Rosso and Winick) (1) of the fetus' size. Consequently, it is of great importance to estimate gestational age before any retardation starts.

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Previous studies reckon that a highest accuracy (error rate ± 4,7 days (2); ± 3 days (3)) in measuring crownrump length (CRL) is attainable when the gestational age of the fetus is estimated between the 6th and the 14th week.

Up to now the measurement of the fetal length has been effected by investigators with manual scanning b-mode apparatuses according to the Robinson method either original (4) or modified (2, 3, 5). With this method fetal and/or maternal movements can lead to errors (2); besides, despite being modified (5), the above mentioned method is a lengthy and complex one.

Therefore, in order to eliminate the disadvantages of previous methods, we have thought it helpful to estimate fetal CRL between the 7th and the 14th week of gestational age by using a Real Time multicrystal scanning apparatus.

Materials and methods

Measurement of CRL has been carried out (with full bladder method) with an Aloka SSD 202 apparatus.

160 consecutive measurings have been taken in pregnant women between the 7th and the 14th week of amenorrhoea; the measurements following the first one and taken on the same woman have not been taken into account.

The patients have been selected according to the following characteristics: i) last menses known in a woman who had previously had regular 26/30 day menstruation; ii) patients under no treatment for six months prior to the beginning of gestation (except women whose ovulation was artificially obtained by pharmacologic treatment and whose fecundation day was necessarily also known); iii) neither patients nor their families ever suffered from hypertension and/or diabetes; iv) easy course of pregnancy (neither risk for miscarriage nor hyperemesis).

The longest fetal CRL has been measured from a picture elarged to the widest, taken of a fetus in full extension; in the best possible scanning conditions (Fig. 1).

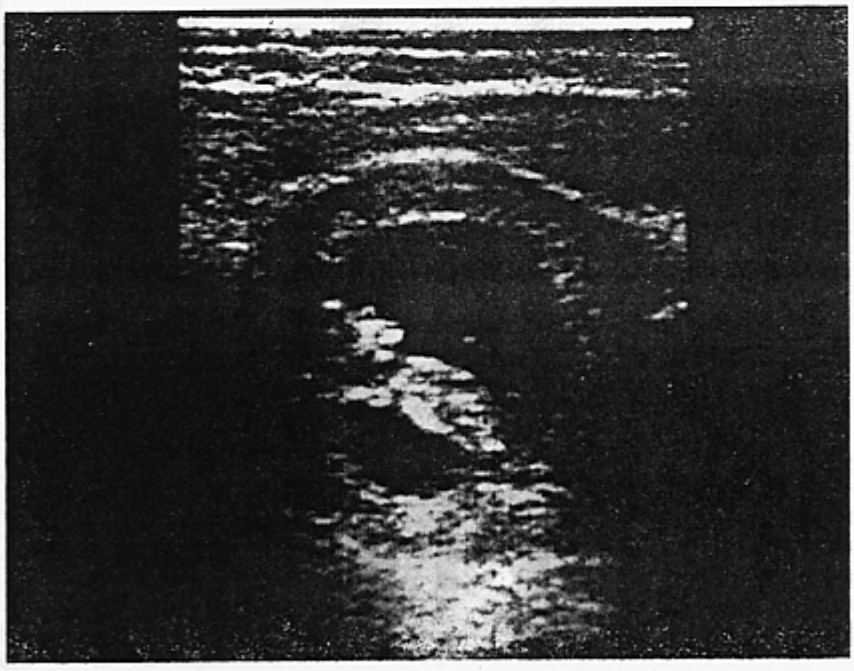

Fig. 1: Longitudinal section by linear multitrasducer of a fetus (78 days from the onset of the last menstrual period) in full extension.

Results and discussion

A graph showing fetal growth between the 7th and the 14th week of gestation and obtained from our measurements (Fig. 2), corresponds to diagrams reported in literature (2, 5, 6).

The results obtained when treating induced pregnancies (ovulation-fecundation date known), and the determination both of biparietal diameter and CRL beginning from the 11th week of amenorrhoea prove that such a method is quite reliable. Moreover, the real time evaluation allows quick and easy measurement of the maximum fetal length. Actually, one can follow the fetal movements and take pictures just when the fetus is fully stretched.

Biginning from the 13th week some measuring difficulty arises owing to the fetus rarely stretching itself.

During the 7th week the structure of the embryo does not allow an easy identification of its major diameter.

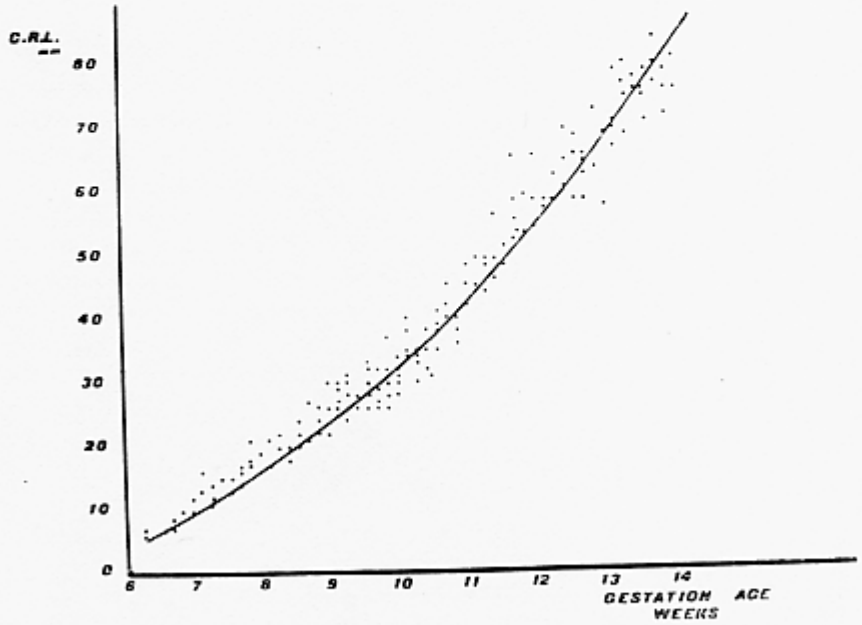

Fig. 2: Mean values and scatter of 160 measurements of fetal crown-rump lengths from 44 to 98 days from the first day of last menstrual period.

REFERENCES

1) Rosso P., Winick M.: Intrauterine growth retardation. A new systematic approach based on the clinical and biochemical characteristics of this condition; J. Perinat. Med. *2*, 147, 1974.

2) Robinson H.P., Fleming J.E.E.: A critical evaluation of sonar "crown rump length" measurements; Brit. Journ. Obstet. & Gynaecol. *82*, 702, 1975.

3) Drumm J.E., MacKenzie G.: The ultrasonic measurement of fetal crown rump length as a method of assessing gestational age; Brit. Journ. Obstet. & Gynaecol. *83*, 417, 1976.

4) Robinson H.P.: Sonar measurement of fetal crown rump length as a means of assessing maturity in first trimester of pregnancy; Brit. Med. Journ. *4*, 28, 1973.

5) Higginbottom J., Slater J., Porter G.: Assessment of gestational age in the first trimester of pregnancy by maximum fetal diameter; Ultrasound in Med. & Biol. Vol. 3, pag. 47, Pergamon Press, 1977.

6) Kurjak A., Cecuk S., Breyer B.: Prediction of maturity in first trimester of pregnancy by ultrasonic measurement of fetal crown-rump length; J. Clin. Ultrasound *4*, 83, 1976.